BATTERY CALCULATIONS
FAP–001,–001A–83

ITEM	DESCRIPTION	QTY	STANDBY CURRENT PER ITEM (AMPS)	TOTAL STANDBY CURRENT PER ITEM	ALARM CURRENT PER ITEM (AMPS)	TOTAL ALARM CURRENT PER ITEM
CP–35	FACP w/2ZN'S + AUD	1	0.1750	0.1750	0.5010	0.5010
PS–35	POWER SUPPLY	1	0.0000	0.0000	0.0000	0.0000
BC–35	BATTERY CHARGER	1	0.0450	0.0450	0.0300	0.0300
AA–30U	CLASS B BELL MODULE	2	0.0065	0.0130	0.0400	0.0800
PM–32	MATRIX MODULE	–	0.0000	0.0000	0.0000	0.0000
RM–30U	RELEASE MODULE	–	0.0050	0.0000	1.5000	0.0000
SM–30	SWITCH MODULE	2	0.0000	0.0000	0.0450	0.0900
SR–30	2 RELAY MODULE	1	0.0000	0.0000	0.0450	0.0450
SR–35	8 RELAY MODULE	1	0.0000	0.0000	0.0210	0.0210
TC–30U	BATTERY TRANSFER	–	0.0000	0.0000	0.0500	0.0000
TL–30U	TIME LIMIT	–	0.0300	0.0000	0.0150	0.0000
ZN–34US	SUPERVISORY MODULE	1	0.0100	0.0100	0.1100	0.1100
ZU–35	ZONE MODULE	1	0.0090	0.0090	0.1100	0.1100
ZU–35DS	ZONE MODULE/SD's	2	0.0090	0.0180	0.1100	0.2200
SMOKE	SMOKE DETECTOR	4	0.0001	0.0004	0.0010	0.0040
MOI	TRANSMITTER	1	0.1200	0.1200	0.1750	0.1750
MID	INPUT BOARD	1	0.0020	0.0020	0.0000	0.0000
PS–5A	POWER SUPPLY	1	0.0380	0.0380	0.0000	0.0000
TOTAL NOTIFICATION APPLIANCES CURRENT						2.1270
	TOTAL SYSTEM CURRENT		STANDBY	0.4304	ALARM	3.5130

MIN. BATTERY CAPACITY = {(TOT. STANDBY CURRENT X STANDBY TIME) +
(TOT. ALARM CURRENT X ALARM TIME)} X 1.25
MIN. BATTERY CAPACITY = {(0.4304 A X 24 HR) + (3.513 A X 0.083 HR)} X 1.25
MIN. BATTERY CAPACITY = {10.3296 AHr + 0.2916 AHr} X 1.25 = 13.2755 AHr

NOTIFICATION APPLIANCE CIRCUIT
VOLTAGE DROP & POWER REQUIREMENTS

CKT AV1: 83 & 83A DESCRIPTION	QTY	CURRENT PER ITEM (AMPS)	TOTAL CURRENT PER ITEM
WHEELOCK STROBE 15 cd	–	0.5010	0.0000
WHEELOCK HORN/STROBE 15cd	2	0.1470	0.2940
WHEELOCK STROBE 30 cd	–	0.0300	0.0000
WHEELOCK HORN/STROBE 30 cd	3	0.1790	0.5370
WHEELOCK STROBE 75 cd	–	0.1650	0.0000
WHEELOCK HORN/STROBE 75 cd	2	0.2520	0.5040
WHEELOCK STROBE 110 cd	1	0.2200	0.2200
WHEELOCK HORN/STROBE 110 cd	1	0.3070	0.3070
WHEELOCK HORN	–	0.0000	0.0000
AUTOCALL BELL	1	0.0500	0.0500
AUTOCALL BELL/STROBE 75 cd	1	0.2150	0.2150
TOTAL NOTIFICATION APPLIANCES CURRENT			2.1270

VOLTAGE DROP (VD) CALCULATIONS

VD = {(I) (D) (21.6)}/CM
WHERE: I = CIRCUIT CURRENT
D = CONDUCTOR LENGTH (FT) ONE WAY
21.6 = CONSTANT
CM = WIRE CROSS–SECTIONAL AREA (CIRCULAR MILS)
VD = {(2.127) (390FT) (21.64)}/4110 = 4.36V
%VD = {4.36V / 24V} X 100 = 18.165%
REMAINING VOLTS = 19.64

WIRE SIZE	CIRCULAR MILS
12AWG	6530
14AWG	4110
16AWG	2580
18AWG	1620
20AWG	1020

FIRE ALARM SYSTEM FUNCTION CHART

SYSTEM EVENT	RESPONSE: ANNUNCIATE AT FACU	FIRE SIGNAL TO RECEIVER	TROUBLE SIGNAL TO LBNL RECEIVER	SUPERVISORY SIGNAL TO LBNL RECEIVER	OPERATE 83 NOTIFICATION DEVICES	OPERATE 83A NOTIFICATION DEVICES	83 AHU–1,–2 SHUTDOWN
83 FIRE CALL BOXES	●	●			●		
83 FACP SMOKE DETECTOR	●	●			●		
83 AHU–1,–2 DUCT SMOKE DETECTORS	●	●			●		●
83 FIRE SPRINKLER WATERFLOW SWITCH	●	●			●		
83 FIRE SPRINKLER VALVE SUPERVISORY SWITCH	●			●			
83A FIRE CALL BOX	●	●				●	
83A SMOKE DETECTOR	●	●				●	
83A FIRE SPRINKLER WATERFLOW SWITCH	●	●				●	
AC POWER FAILURE	●		●				
SYSTEM FAULT	●		●				

AS BUILT
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10/23/13

PROFESSIONAL SEAL (IF REVISION, APPLIES ONLY TO REVISED WORK)

ISSUE (PROGRESS, ESTIMATE, BID, CONSTRUCTION, CONFORMED, REVISION, RECORD)

REVISION NUMBER	DRAWN BY	CHECKED BY	APPR'D BY	DATE	REMARKS
_	LDD	LDD	MCD	10/23/13	AS BUILT

83, 83A FIRE ALARM SYSTEM
FUNCTION CHART & CALCULATIONS

UNIVERSITY OF CALIFORNIA
LAWRENCE BERKELEY NATIONAL LABORATORY
FACILITIES DIVISION

DRAWN BY LDD	DATE 10/23/2013
CHECKED BY LDD	10/23/2013
APPROVED BY MCD	10/23/2013
SCALE AS NOTED	
DRAWING NO. 4B83E048_	SHEET FA
PROJECT NO. 000000	1 OF 1